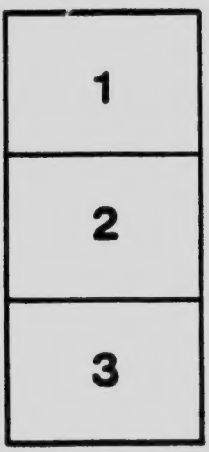

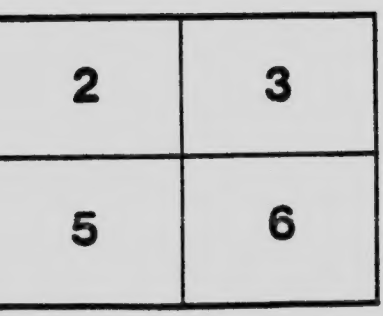

DEPARTMENT OF THE INTERIOR, CANADA
Hon. Frank Oliver, Minister; W. W. Cory, Deputy Minister.

FORESTRY BRANCH—BULLETIN No. 22
R. H. Campbell, Director of Forestry.

FOREST PRODUCTS OF CANADA

1910

CROSS-TIES PURCHASED

COMPILED BY

H. R. MACMILLAN, B.S.A., M.F.

AND

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LETTER OF TRANSMITTAL

FORESTRY BRANCH

DEPARTMENT OF THE INTERIOR,

OTTAWA, September 15th, 1911

SIR,—I have the honor to transmit herewith a statistical report on the "Cross-ties Purchased" by the railways of Canada during 1910, and to recommend its publication as Bulletin No. 22 of this Branch.

The Bulletin treats of the amount of wood consumed for cross-ties by the steam and electric railway companies of the Dominion during the year specified, distinguishing the amount of wood of the different species used and the method of its manufacture.

I have the honor to be, Sir,

Your obedient servant,

R. H. CAMPBELL,
Director of Forestry.

W. W. C C. M. G.,
Deputy Minister of the Interior,
Ottawa.

CROSS-TIES PURCHASED IN 1910

The data upon which this report is based were furnished by the steam and electric railways of Canada. The value given for the ties was the cost at the point of purchase.

There were 9,213,962 cross-ties, costing $3,535,628 purchased in 1910 by the steam and electric roads of Canada. This represents a decrease of 4,964,279, or 35 per cent from the number purchased in 1909, due to the decreased purchase of ties for new steam railway lines.

This decrease was general throughout the important species except with Douglas fir. The average cost of these ties at the point of purchase was 38 cents, being an increase of one cent over the cost in 1909.

Table 1 gives the number of ties of each kind of wood purchased in 1909 and 1910, with their total and average cost, and the per cent each species forms of the total.

TABLE 1.

CROSS-TIES PURCHASED, 1909 AND 1910, BY SPECIES: Number, Cost, Average Cost per Tie and Per Cent each Species forms of the Total.

Kind of Wood.	1909				1910			
	Number.	Cost.	Average Cost Each	Per cent. Distribution.	Number.	Cost.	Average Cost Each	Per cent. Distribution.
		$	cts.			$	cts.	
Cedar	4,131,390	1,859,121	45	29 9	3,670,398	1,509,943	41	40 0
Jack Pine	3,404,501	1,021,450	30	24 8	2,150,586	731,945	33	23 5
Hemlock	1,850,056	610,512	33	13 2	1,254,605	509,190	40	13 8
Douglas Fir	654,403	225,258	34	4 6	885,480	261,582	30	9 6
Tamarack (Larch)	2,811,820	1,096,610	39	19 8	663,922	241,092	36	7 1
Oak	34,489	21,292	62	0 2	264,647	195,145	74	2 9
Spruce	891,573	222,893	25	6 3	233,702	64,590	28	2 5
Cypress	8,362	3,010	36	(1)	44,489	16,561	38	0 4
Chestnut	84,669	49,809	59	0 7	19,184	12,243	64	0 2
White Pine	92,633	27,519	30	0 7	1,849	667	36	(1)
Unspecified	214,462	72,577	34	1 6	25,111	12,606	50	0 2
Total	14,178,241	5,210,490	37	100	9,213,962	3,535,628	38	100.

(1) Less than one-tenth of one per cent.

Three kinds of wood supplied 77 per cent of all the ties purchased. These were cedar, jack-pine and hemlock.

Though not as many cedar ties were purchased in 1909 as in 1910, cedar is still the chief species used in Canada. In 1910, it furnished 40 per cent of the ties purchased by Canadian roads, as against 29.8 per cent in 1909. Nearly all the cedar used is eastern cedar (*Thuja occidentalis*), as western cedar (*Thuja plicata*) is too soft for satisfactory use as cross-ties, except for electric lines where the traffic is light.

Jack pine stood second in importance in cross-tie production. In 1910 it supplied 23.5 per cent of the ties used in Canada, which was practically the same percentage as used in 1909.

Hemlock, supplying 13.8 per cent of the total consumption, occupied third position in 1910. Hemlock has also for the first time passed tamarack as a tie-producer. The advance of hemlock from the fourth position, which it previously held, is due not to an increase in the use of hemlock, but to a decrease in the use of tamarack.

Douglas fir furnished 9.6 per cent of the ties purchased in 1910 as against 4.6 per cent in 1909. About 232,000 more Douglas fir ties were purchased in 1910 than in 1909. This species was used to a greater extent by both steam and electric railways.

Tamarack ties dropped from third place in 1909, when they formed 19.8 per cent of the total, to fifth place in 1910, when they formed only 7.1 per cent. In 1910 only 663,922 tamarack ties were purchased as compared with 2,811,820 purchased in 1909. This great decrease of 2,147,898 ties is found chiefly in the number used by steam roads, and is due to the fact that the

purchase of ties for the eastern half of one of the new transcontinental roads was completed previous to 1910.

The above five species, namely, cedar, jack pine, hemlock, Douglas fir, and tamarack, represent 94 per cent of the total number of ties used. Nearly all the remainder is made up of oak and spruce.

The number of oak ties purchased in 1910 was 264,647, or an increase of 230,258 over the number purchased in 1909. This is due to one United States Railway, operating in Canada, which is using a great proportion of [illegible] woods. Aside from this road the railways of Canada use oak ties chiefly for switch ties.

The use of spruce, one of the cheapest ties, has fallen off greatly, 657,871 ties less being purchased in 1910 than in 1909. The decrease in the purchase of spruce is due to the same reason as that ascribed to tamarack.

The remaining species, cypress, chestnut, and white pine, are used to a small extent for ties. All the cypress and chestnut ties and practically all the oak were imported from the United States. Red pine and yellow pine, which were used in 1909, were not reported in 1910.

The average price of ties in 1910 was 38 cents as compared with 37 cents in 1909. Of the important woods oak cost the most, 74 cents per tie, and spruce the least, 28 cents per tie. Cedar cost 41 cents per tie, as compared with 45 cents per tie in 1909. Douglas fir cost 30 cents per tie in 1910, or 4 cents less per tie than in 1909. The remaining woods, or all excepting these two, have advanced in price from 3 to 12 cents per tie.

Table 2 gives the total number of ties purchased in 1910 by species and method of manufacture.

TABLE 2.

CROSS-TIES PURCHASED, 1910, BY SPECIES AND METHOD OF MANUFACTURE: Number, Total Cost and Average Cost.

Kind of Wood.	Sawn Ties.				Hewn Ties.			
	Number.	Cost.	Average Cost Each	Per cent. Sawn	Number.	Cost.	Average Cost Each	Per cent. Hewn
		$	cts.			$	cts.	
Cedar	472,797	154,693	33	13 0	3,197,401	1,353,[illegible]	42	87 0
Jack Pine	847,079	307,724	37	39 0	1,31[illegible]	404,2[illegible]	31	61 0
Hemlock	589,481	152,948	26	47 0	6[illegible]	356,242	55	53 0
Douglas Fir	428,012	129,111	30	48 4	4[illegible]	132,471	2[illegible]	51 6
Tamarack	13,236	3,801	29	2 0	650[illegible]	237,291	36	98 0
Oak	250,805	185,858	74	95 0	1	9,277	68	5 0
Spruce	144,898	39,611	29	57 [illegible]	98,804	24,979	25	42 2
Cypress	34,305	12,487	36	90 6	10,184	4,074	40	9 4
Chestnut	19,184	12,233	64	100 0	[illegible]	[illegible]	[illegible]	[illegible]
White Pine	438	101	23	[illegible]	1,300	560	40	76 2
Unspecified	11,388	6,521	58	[illegible]	63,723	6,174	45	54 7
Total	2,791,671	1,405,0[illegible]8	36	30	6,422,291	2,530,530	39	70

Approximately 70 per cent of all the ties purchased in 1910 were hewn. It is apparent that methods of manufacture of ties are not undergoing any great general and permanent changes. Sawn ties were 30 per cent of the total, which is the same proportion as in 1909. The only important species which has a majority of sawn ties is oak, 95 per cent of which were sawn ties. Cedar ties were 81 per cent hewn, and 61 per cent of the jack pine ties were hewn. Hemlock and Douglas fir were about evenly divided in the method of manufacture. In the case of tamarack, 98 per cent were hewn ties, while the minor varieties were principally sawn ties. The hewn ties are nearly all pole ties, the sawn ties are made chiefly from larger timber.

Sawn ties cost on the average 36 cents per tie. Hewn ties cost 3 cents more, or 39 cents per tie. Oak was the most expensive of sawn ties, costing 74 cents per tie. White pine was the cheapest of the sawn ties, costing only 23 cents per tie. In hewn ties, oak was also the most expensive, costing 68 cents, and spruce ties were the cheapest, costing 25 cents per tie.

Table 3 shows the number and cost of cross-ties used for steam railways in 1909 and 1910, classified by species, with the average cost per tie of each species and the per cent each species forms of the total.

TABLE

CROSS-TIES PURCHASED, 1909 AND 1910, FOR STEAM RAILWAYS BY SPECIES: Number, Total Cost, Average Cost per Tie and Per Cent each Species forms of the Total.

Kind of Wood.	1909				1910			
	Number.	Cost.	Average Cost Each.	Per cent. Distribution.	Number.	Cost.	Average Cost Each.	Per cent. Distribution.
		$	cts.			$	cts.	
Cedar	3,079,454	1,858,609	45	29 5	4,525,228	1,457,419	41	39 6
Jack Pine	3,404,501	1,021,350	30	24 6	2,146,586	710,913	33	24 5
Hemlock	1,844,762	608,830	33	14 4	1,230,815	380,281	30	12 8
Douglas Fir	626,946	211,864	34	4 8	288,256	117,309	28	8 8
Tamarack	2,803,820	1,092,130	39	20 3	980,436	244,450	36	7 4
Oak	21,207	13,199	62	0 2	287,937	191,155	58	8 0
Spruce	889,659	223,473	25	6 4	229,676	62,641	27	2 6
Cypress	8,362	3,010	36	(1)	4,305	1,487	37	0 4
Chestnut	84,669	49,809	59	0 6	19,184	12,243	64	0 2
White Pine	92,484	27,304	30	0 7	1,838	661	36	(1)
Unspecified	213,296	72,502	34	1 5	23,111	12,696	50	0 2
Total	14,069,119	5,158,596	37	100 0	9,909,422	3,612,227	38	100

(1) Less than one-tenth of one per cent.

The steam railways, using 96 per cent of all the ties, take them in about the same proportion and at the same prices as they are quoted in Table 1. The decrease in use of ties in 1910 as noted above is due chiefly to decreased purchase by the steam railways, which used 5,159,697 ties less in 1910 than in 1909. The average cost of steam railway ties is about the same as in Table 1, due to the fact that nearly all the ties were purchased by steam roads. All the white pine and chestnut ties purchased in 1910 were purchased by steam roads.

Table 4 gives the number of ties purchased by steam roads in 1910, according to method by which made.

TABLE 4.

CROSS-TIES PURCHASED, 1910, BY STEAM RAILWAYS BY SPECIES AND METHOD OF MANUFACTURE: Number, Total Cost, Average Cost per Tie and Per Cent each Species forms of the Total.

Kind of Wood.	Sawn Ties.				Hewn Ties.			
	Number.	Cost.	Average Cost Each.	Per cent. Sawn.	Number.	Cost.	Average Cost Each.	Per cent. Hewn.
		$	cts.			$	cts.	
Cedar	442,877	138,669	32	12 2	3,092,351	1,318,750	42	57 8
Jack Pine	837,079	307,724	37	39 0	1,311,507	403,191	31	61 0
Hemlock	579,761	148,842	26	47 9	651,554	351,439	54	52 1
Douglas Fir	369,485	100,045	27	46 9	419,503	117,364	28	53 1
Tamarack	12,554	3,554	29	1 9	647,892	230,766	36	98 1
Oak	244,944	183,428	75	95 0	14,014	8,027	68	5 0
Spruce	145,398	38,496	29	58 1	96,278	24,145	25	41 9
Cypress	34,305	12,487	37	100 0				
Chestnut	19,184	12,243	64	100 0				
White Pine	438	101	24	24 8	1,400	560	40	76 2
Unspecified	11,388	6,521	57	45 4	13,723	6,175	45	54 7
Total	2,674,900	951,010	36	30	6,236,522	2,461,217	39	70 0

Steam roads use such a large proportion of the ties purchased that this table is practically the same as Table 2.

Hewn cypress ties were imported, but not used by steam roads.

Table 5 shows the number and cost of cross-ties used for electric railways in 1909 and 1910, classified by species, with the average cost per tie of each species and the per cent each species forms of the total.

TABLE 5.

CROSS-TIES PURCHASED, 1909 AND 1910, BY ELECTRIC RAILWAYS BY SPECIES: Number, Total Cost, Average Cost per Tie and Per Cent each Species forms of the Total.

Kind of Wood.	1909				1910			
	Number.	Cost.	Average Cost Each	Per cent. Distribution.	Number.	Cost.	Average Cost Each	Per cent. Distribution.
		$	cts.			$	cts.	
Cedar	51,960	20,512	39	48 7	145,170	52,524	37	48 1
Douglas Fir	26,457	15,394	58	24 7	97,194	44,173	46	32 2
Hemlock	5,294	1,682	32	4 9	23,790	8,909	37	7 9
Tamarack	8,000	4,480	56	7 5	13,476	6,772	50	4 4
Cypress					10,184	4,074	40	3 3
Oak	13,182	8,093	61	12 3	6,700	3,980	59	2 2
Spruce	1,914	520	28	1 8	4,026	1,949	48	1 3
Jack Pine					2,000	1,020	51	0 6
White Pine								
Unspecified	150	216	1 44	0 1				
	166	75	45	0 1				
Total	107,129	50,972	47	100.	302,540	123,401	41	100 0

The electric railways used four per cent of all the ties purchased in 1910. In 1910, 195,411 more ties were used by electric roads than in 1909, representing an increase of 182 per cent, mainly in the use of cedar and Douglas fir. This is due to much increased construction. Nearly 50 per cent of the total number used were cedar ties at a cost below the average, namely, 37 cents.

Douglas fir constituted 32 per cent of the total. Jack pine, being at a distance from the electric railways, was used only to the extent of 0.6 per cent, the ties costing 51 cents each. In steam roads 23 per cent of the ties used were jack pine, and they cost only 33 cents each. Very little spruce and no chestnut or white pine were used in the construction of electric roads. Over 10,000 cypress ties were imported at an average cost of 40 cents each. This is the first report of cypress ties being used for electric roads.

The average cost of ties used in 1910 by electric roads was 41 cents, as compared with 47 cents in 1909. This is due largely to the decrease of 2 cents per tie in the cost of cedar ties and 12 cents in the cost of Douglas fir ties. It is an interesting fact that, although the average tie used by electric roads is smaller than that used by steam roads, the price paid for it is generally greater, viz., 3 cents per tie more in 1910. This is due not only to the disadvantages incident to contracts for smaller quantities of material, but also to the fact that the electric roads are more likely to purchase ties at points where the price includes railway transportation charges. This is shown by the electric roads paying not less than 37 cents for their ties, while many used by the steam roads were bought for 27 cents per tie.

Table 6 gives the number and cost of ties purchased by electric roads in 1910, according to method by which made.

TABLE 6.

CROSS-TIES PURCHASED BY ELECTRIC RAILWAYS, 1910, BY SPECIES AND METHOD OF MANUFACTURE: Number Total Cost, Average Cost per Tie and Per Cent each Species forms of the Total.

Kind of Wood.	Sawn Ties.				Hewn Ties.			
	Number.	Cost.	Average Cost Each	Per cent. Sawn	Number.	Cost.	Average Cost Each	Per cent. Hewn
		$	cts.			$	cts.	
Cedar	39,920	16,024	40	72 5	105,250	36,500	35	27 5
Douglas Fir	58,529	29,066	49	60 2	38,665	15,107	39	39 8
Hemlock	10,190	4,106	40	42	13,600	4,803	35	57 1
Tamarack	682	247	37	5 0	12,794	6,525	51	95 0
Oak					10,184	4,074	40	100 0
Spruce	5,950	3,530	68	88 8	750	450	60	11 2
Jack Pine	1,500	1,115	74	37 3	2,526	834	33	62 7
					2,000	1,020	51	100 0
Total	116,771	54,088	46	38 6	185,769	69,313	37	61 4

With electric roads 61.4 per cent of the ties purchased were hewn, as contrasted with the steam roads, where 70 per cent were hewn. Douglas fir constituted 50 per cent of the sawn ties and cedar constituted 34 per cent. Cedar made up 57 per cent of the hewn ties and Douglas fir 20.7 per cent.

The species which are chiefly used sawn are cedar, Douglas fir and oak. The species which are chiefly used hewn are hemlock, tamarack, cypress, spruce and jack pine. All the cypress and jack pine ties used were hewn.

The average price of hewn ties was 37 cents, or 2 cents per tie less than was paid by steam roads.

It is interesting to note that whereas with steam roads hewn ties cost 3 cents per tie more than sawn ties, with electric roads sawn ties cost 9 cents per tie more than hewn ties.

Imports from the United States of cross-ties in 1910 amounted to $1,090,832. Exports in 1910 were 1,995,582 ties at a value of $463,508. Of this total $376,913 was to the United States. The balance of imports over exports was $633,324, which represents about 891,000 ties at the average price paid for ties in Canada in 1910.

PRESERVATION.

Two plants are now being established for the chemical treatment of railway ties. One is being erected at Fort Frances, Ontario, and the other is being started at Winnipeg. It is stated that a plant will also be erected at Vancouver. The plant at Ft. Frances will be capable of treating 2,000 ties per day. The zinc-chloride-aluminium patent immersing process will be used, which both prolongs the life of the timber and renders it fireproof. It is questionable if this process will give as good results in Canada as would creosote.

This is a matter which for some years has been necessary for the preservation of the forests of Canada. At the same time it would have reduced the annual cost of railway maintenance. The average life of untreated ties as reported by the steam roads is : cedar, 9 years ; tamarack, 8 years ; hemlock, 7 years ; Douglas fir, 7 years ; jack pine, 6 years ; spruce, 6 years. As may be noted from the tables, cedar is the species principally used, because of its durability, but the supply of cedar is rapidly becoming exhausted. Unless preservative treatment of ties is introduced, the species of short life will have to be used untreated, which, on account of the necessary frequent renewal, will increase the cost of mileage maintenance. If treated ties were used, which would cost about 30 cents extra per tie for creosoting and equipping with tie plates, the inferior species, which are very plentiful and cheap in Canada, could be used with economy. With such a treatment these woods would last at least 15 years, and if protected from wear would probably last much longer.

The lodgepole pine of the west would be greatly increased in usefulness by this treatment. This species is used chiefly for mining timbers and props and occurs, fire-killed, in vast areas on the mountain slopes of Alberta and British Columbia. It cannot be used for lumber, on account of checking, and, if untreated, it lasts only about 5 years when used for railway ties. At present this wood stands dead and perfectly seasoned and would take chemical treatment readily, after which it would make lasting and economical ties. By the use of such inferior qualities of timber, railway companies would assist conservation and at the same time decrease the cost of railway maintenance.

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